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Relative Abundance of Diurnal Raptors as an Index of Potential Exposure to an Avicide used to Cull Blackbirds

Key Words: *Red-tailed Hawk*; Buteo jamaicensis; *abundance*; *avicide*.

Spring baiting with the avicide DRC-1339 (3-chloro-4-methylaniline hydrochloride, also 3-chloro-*p*-toluidine hydrochloride) has been evaluated for decreasing crop-depredating populations of blackbirds (e.g., *Agelaius phoeniceus*) in the northern Great Plains (Linz et al. 2003, *Crop Prot.* 22:261–264; Blackwell et al. 2003, *J. Wildl. Manage.* 67:818–828). Toxicological data suggest negligible secondary poisoning hazards associated with the use of DRC-1339 because this avicide is almost completely metabolized and excreted by birds within 30 min, accounting for low (<30 ng/g) residues (Goldade et al. 2004, *J. Agric. Food Chem.* 52:8074–8080). Further, most raptors are not particularly sensitive (LD_{50} ≥100 mg/kg) to DRC-1339 (Eisemann et al. 2003, *in* G.M. Linz [Ed.], Management of North American blackbirds, National Wildlife Research Center, Fort Collins, CO U.S.A.). Regardless, predators are known to select the prey that is easiest to catch (e.g., poisoned prey; Hunt et al. 1992, *Anim. Behav.* 43:971–976). Given the data of Kostecke et al. (2001, *J. Field Ornithol.* 72:439–447) on frequency of attendance by raptors at bird carcasses and caged, live birds used to simulate poisoned prey, we questioned whether these behavioral data are indicative of raptor use of DRC-1339 operational areas.

Thus, our objective was to assess the relative abundance of diurnal raptors near sites where baiting was occurring as an index of relative exposure risk to DRC-1339-contaminated prey.

Annually, DRC-1339-treated bait has been placed near blackbird roosts in east-central South Dakota during the first half of April (Barras 1996, M.S. thesis, North Dakota State University, Fargo ND U.S.A.). We conducted 3-min fixed-radius (0.4-km) point counts (Hutto et al. 1986, *Auk* 103:593–602) at different times of day in 93-km^2 areas centered near each baited roost between 22 March and 23 April 1994 (Clark, Long Lake, Ramona, and Wentworth roosts), 1995 (Arlington, DeSmet, and Ramona roosts), and 1998 (Arlington and Ramona roosts), using road intersections as count points (N = 20–25 points/roost). Our survey efforts varied among years (N = 9–15 surveys/roost in 1994, N = 5–8 surveys/roost in 1995, and 27–28 surveys/roost in 1998).

We used a nonparametric ordinal ranking approach to assess exposure risk (Conover 1980, Practical nonparametric statistics, Wiley, Indianapolis, IN U.S.A.). Across roosts (N = 9), we averaged the mean number of detections/point/survey/roost/year and mean frequency of occurrence/roost/year for each species. The first statistic provides information on seasonal pulses such as migration events, as well as distribution across the sampling area. The second statistic provides information on rarity. We subranked the values of each of these statistics and then calculated a final rank indicative of exposure risk.

Mean number of detections of Red-tailed Hawk (*Buteo jamaicensis*), American Kestrel (*Falco sparverius*), Northern Harrier (*Circus cyaneus*), Bald Eagle (*Haliaeetus leucocephalus*), and other raptors (Turkey Vulture [*Cathartes aura*], Osprey [*Pandion haliaetus*], Sharp-shinned Hawk [*Accipiter striatus*], Cooper's Hawk [*A. cooperii*], Swainson's Hawk [*B. swainsoni*], Rough-legged Hawk [*B. lagopus*], and Merlin [*F. columbarius*]) were 0.060, 0.036, 0.028, 0.028, and 0.027, respectively. Frequency of occurrence of Red-tailed Hawk, American Kestrel, Northern Harrier, Bald Eagle, and other raptors were 0.265, 0.195, 0.165, 0.062, and 0.147, respectively. Risk of exposure to contaminated prey appears to be highest for Red-tailed Hawk (final rank = 1), followed by American Kestrel (final rank = 2), Northern Harrier (final rank = 3.25), Bald Eagle (final rank = 4.25), and other raptors (final rank = 4.5). Photographic evidence confirmed that Red-tailed Hawks and harriers would most likely consume poisoned prey, as the two species accounted for 80% of the diurnal raptors photographed at bird carcasses and caged, live birds placed near DRC-1339-baited blackbird roosts (Kostecke et al. 2001). In comparison, though commonly detected on point counts, kestrels were never photographed at bird carcasses or caged, lived birds (Kostecke et al. 2001). Thus, in the absence of behavioral data, it is important to note that relative abundance measures based on point count data alone may not accurately reflect exposure risk.

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